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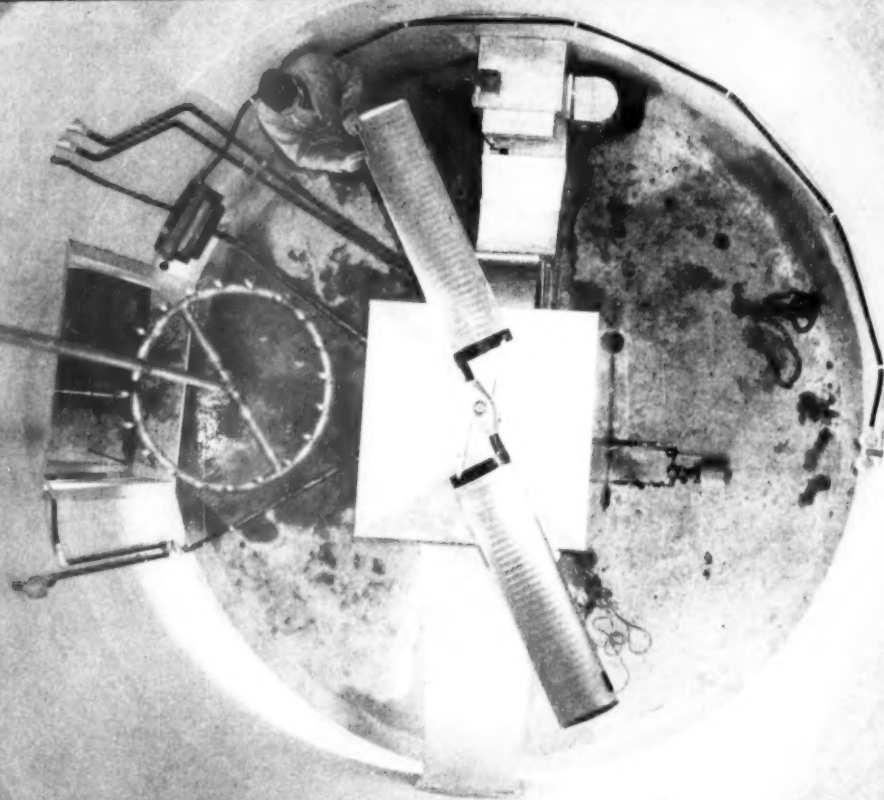
August 2, 1958

VOL. 74 NO. 5

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Test Tower

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A SCIENCE SERVICE PUBLICATION

PHYSICS

New Metals Made by Meteorite Principle

► METALS formerly "impossible" to produce will be created by Air Force scientists who bombard objects with tiny high speed particles in much the same way micro-meteorites from outer space smash into missile shells and satellite skins.

Through similar methods, the scientists will also produce revolutionary new materials and perfect vacuums.

One of the first investigations to be made by the new technique announced by the Air Research and Development Command will be the testing of missile and satellite coverings subjected to high speed particles bombardment.

However, the actual creation of alloys and compounds of incompatible materials is the major objective of Wright Air Development Center scientists who pioneered "micrometeorite bombardment" from their Dayton, Ohio, headquarters.

Officials cite as an example a possible alloy of aluminum and iridium.

Aluminum, which begins to boil away at 3,740 degrees Fahrenheit, cannot be combined as a liquid with iridium, which does not melt until it reaches 4,450 degrees.

Now, scientists using the new technique will pulverize the iridium to very small particles, probably about one 25-thousandth of an inch in diameter, and shoot them at extremely high speed into the tiny crevices in aluminum's lattice-like structure.

Thus, by shooting solid aluminum full of solid iridium, the impossibility of mixing the two in the molten state is no longer a barrier to an alloy that will have aluminum's desirable aircraft properties, yet have a much higher melting point for space-age use.

Micrometeorite bombardment will also be used to make long molecular chains of compounds composed of organic and non-organic substances, many of which could not be produced by previous methods.

Perfect vacuums that are needed before many laboratory studies can proceed further will be created by literally blasting out the last traces of air with high speed particles until a "hard" vacuum is produced.

Science News Letter, August 2, 1958

EVOLUTION

Mammal-Like Reptiles Link Animal Groups

► FOUR SKELETONS of small reptiles—about the size of a cocker spaniel—may soon be providing scientists with more information on the evolution of mammals.

They probably are a transition stage between mammals and reptiles.

Although the animals can hardly be direct reptilian ancestors of mammals, Dr. D. H. Dunkle of the Smithsonian Institution pointed out, they are so close to mammals that some classifiers have put them with this later group. One characteristic in particular seems to link them with mammals: their teeth.

Incisor teeth "somewhat similar to those

of present-day rodents" and cheek teeth like those found in extremely primitive mammals, the multituberculates, are found only in these reptiles.

The nearly complete skeletons, collected by Dr. G. Edward Lewis, U.S. Geological Survey, and Dr. Dunkle on the Western Navajo Indian Reservation in Arizona, are probably the most complete remains yet found of the reptiles. They belong to a group of land-dwelling, four-legged, cold-blooded animals called *ictosaurs*.

Dr. Lewis is now engaged in an intensive study of the remains, which were found imbedded in rock formed about 160,000,000 years ago. So far no name has been given the new species.

The Smithsonian Institution, Washington, will keep the skeletons in its collections.

Science News Letter, August 2, 1958

TECHNOLOGY

Heat More With Electric Blanket

► HOMES IN MILD climates can be heated uniformly and at low cost with "electric blankets" manufactured in the form of floor carpeting.

For slightly over one U.S. cent per hour British householders can heat an average living room to a comfortable temperature in mild winter weather, officials of Thermalay, Ltd., Halifax, England, reported.

Floor temperature averages 70 to 75 degrees Fahrenheit, and only 80% of the floor needs to be covered by the new electric carpet to achieve maximum comfort. Because the electrical heating elements are distributed evenly over the floor, less heat is needed at the source to warm all the room air uniformly than is required by most conventional heating arrangements, the developers said.

The carpet consists of a high strength steel element, coated with hard plastic insulation, placed between two layers of felt bonded together by an adhesive. Thermalay engineers said the danger of fire has been eliminated by using a plastic insulation tough enough to withstand the normal movement of furniture over the carpet. They said even a hammered nail will glance off rather than penetrate the wire.

Thermalay officials claim no other form of heating is needed in mild winter weather if about 80% of the floor is carpeted with the heating pad.

At present the new heater is designed for use under conventional carpets. It is not made in floor carpet patterns.

Science News Letter, August 2, 1958

CHEMISTRY

Lipids Hold Secrets To Baking Success

► A MISSING LIPID may be at the root of some baking failures.

Chemists at the U. S. Department of Agriculture's laboratories have found that lipids, fat-like substances found in many foods, can greatly affect flour's baking behavior and storage. Even though they make

up only one and one-half percent of flour by weight, the absence of lipids yields bread that is hard and small.

Research conducted by USDA chemists D. K. Mecham and J. W. Pence at the Western Utilization Research and Development Division, Albany, Calif., has shown that three kinds of lipids can be extracted from flour and then added back. As much as four-fifths of the total lipids in flour can be removed and may result in better bread as long as the recipe calls for no shortening.

Removing the rest of the lipids, however, or using shortening can have disastrous effects on loaf volume and quality.

In some way still unknown, lipids play a very important role in flour quality. They cannot be replaced by ordinary shortening fats, simple fats such as lard and vegetable oils. Some lipids are tightly bound chemically to proteins and are essential to good bread baking.

Changeability, particularly changing into acids, is another characteristic of lipids. They generally change more rapidly than any other part of flour and some of these changes make a product that is rancid, with poor texture and flavor.

Science News Letter, August 2, 1958

PHARMACOLOGY

Five English Scientists Perfect Hypotensive Drug

► AN ORAL DRUG that acts against high blood pressure has been reported.

The drug, 1:2:2:6:6-pentamethylpiperidine, acts as a ganglion-blocking agent. It is well-absorbed on oral administration and possesses potential advantages over mecamylamine, in respect to tolerance, duration of action and rapidity of excretion, five English scientists report in *Nature* (June 21). Mecamylamine is a widely used hypotensive drug.

The scientists are G. E. Lee, W. R. Wragg, S. J. Corne, N. D. Edge and H. W. Reading of the Research Laboratories, May and Baker, Ltd., Dagenham, Essex.

Science News Letter, August 2, 1958

ORNITHOLOGY

Studies "Food Poisoning" of Ducks

► "BUGS," tiny insect larvae and crustaceans are now suspect as the killers of thousands of water birds.

U. S. Fish and Wildlife scientists believe they may play a double role in spreading avian botulism, a disease that has caused the death of as many as 10,000 ducks to the mile along some lake shores. The creatures feed on the disease-causing bacterium, *Clostridium botulinum*, and may concentrate the toxin already in the bacterium. When ducks eat these small invertebrates they get the toxin.

Giving sick ducks antitoxin and increasing the water's depth in affected areas can help control the disease.

The same bacterium can cause food poisoning in humans when canned foods are incorrectly processed.

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ASTRONAUTICS

Supercool Man for Space

One of the problems of space travel, the intense heat to which the space man will be subjected, is being studied with evidence pointing to supercooling as a solution.

➤ MAN CAN stand the heat much better if he is pre-cooled first, the Air Force has found out.

The lower the temperature of a man's insides, the better he can stand outside heat, says Dr. Paul Webb of the Aero Medical Laboratory, Wright Air Development Center, Dayton, Ohio. Dr. Webb and a group of military and civilian scientists are studying man's tolerance to high temperatures as one of the problems to be encountered in space flight.

"If we knew how the human body thermostat works, we probably could double man's tolerance of heat," Dr. Webb said. He and the military members of his section serve as "guinea-pigs" in their own experiments.

The theory is borne out by tests showing that a sedentary worker, such as the pilot of a space ship, finds outside heat intolerable when his inside temperature rises above 102 degrees Fahrenheit. When subjected to external 160 degrees heat, his internal temperature rises one degree in 20 minutes. Thus a man with a normal temperature of 98.6 degrees Fahrenheit could stand this external heat only for about an hour before his internal temperature reached 102 degrees.

In the pre-cooling process, the subjects were first placed in a tank of 60-degree water. Their internal temperatures showed

little change from normal in the first half hour. During the next half hour, their internal temperatures dropped one degree, and in the third half-hour it dropped another degree to a little over 96 degrees.

Popped into the 160-degree chamber, the subjects were then able to withstand the searing heat for almost two hours. The difference of one hour represents the time required to raise the body temperature to normal at the rate of one degree every 20 minutes.

Also under investigation is "transient" heating, such as might be experienced by a man in a space-ship during escape from and re-entry into the earth's atmosphere. In this experiment, men are heated from room temperature to 160 degrees; left for a half hour; and then re-cooled. In other tests, an unclothed subject is kept for half-hour intervals at 130 degrees, 75 degrees, and 55 degrees. Various patterns of the three temperatures are often used.

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ZOOLOGY

Doubt Thrown on Ability Of Paramecium to Learn

➤ PROBABLY the primitive one-celled animal, the paramecium, cannot learn after all.

At least a research team of scientists find that its ability to learn is not proved.

Previously scientists have found these little creatures can "learn" to go to a platinum wire suspended in the liquid in which they are swimming, if the wire has previously held food. Another study seemed to indicate that paramecia can "learn" to avoid the lighted portion of their swimming pool when that side of the well had previously been heated to an uncomfortable temperature.

Now it seems more likely that it is the pool and not the animal that was "conditioned." When the conditions of the experiment are so arranged that there is no possibility of permanent or relatively permanent changes in the environment of the paramecium, then no change occurs in the behavior of the one-celled animal.

The new research is reported in *Science* (June 27) by Drs. Allan F. Mirsky of the National Institute of Mental Health, Bethesda, Md., and Milton S. Katz of the University of Rochester, Rochester, N. Y.

Science News Letter, August 2, 1958

GEOPHYSICS

80-Year-Old Tide Theory Confirmed by Computers

➤ HIGH-SPEED electronic computers have confirmed an 80-year-old theory that the circular wobble of the earth's poles causes small ocean tides.

In the 1870's Lord Kelvin, a famed British scientist, suggested that the earth's poles moved in a rough circle, approximately 16 feet in diameter, within a 14-month period.

From this, he postulated that the polar motion, called "free nutation" and akin to the wobbly motion of a spinning top, should create its own ocean tides.

Proof of this theory had never been attempted, largely because of the amount of mathematical computations required.

One scientist long interested in the theory has been Dr. Walter H. Munk, professor of geophysics at the University of California Scripps Institution of Oceanography and the UCLA Institute of Geophysics.

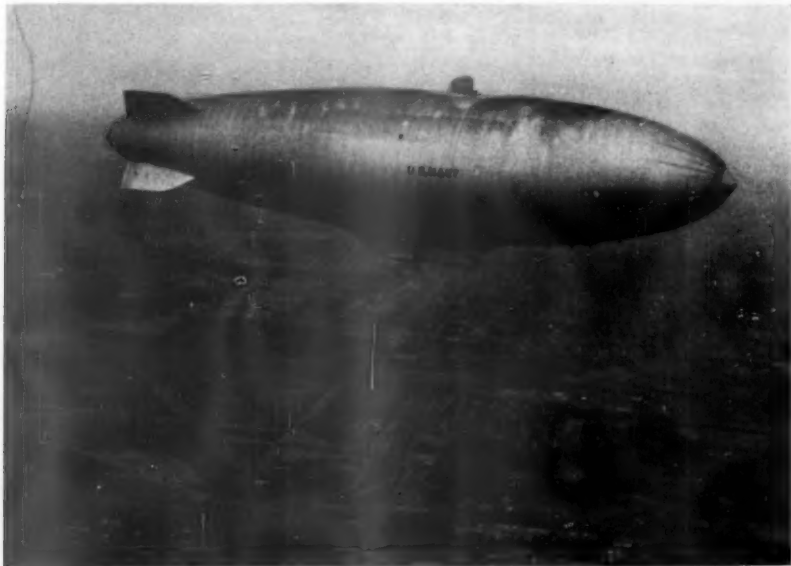
Joined by Richard Haubrich, graduate student in geophysics, he collected data for the last 100 years from each of 11 tide stations in Europe, South America, the United States, and in the Indian Ocean.

Dr. Munk and Mr. Haubrich took their carload of data to the Numerical Analysis Research center at UCLA for preliminary work and then fed the raw material into an aircraft company's high-speed computer, which clicked off the necessary 250,000,000 mathematical computations within one and a half hours.

Interpreting the computed data, the two geophysicists proved the existence of a polar-created tide, independent of the tides caused by the sun or moon.

"Our findings, which would hardly have been possible before the development of the computer, fill another gap in our incomplete knowledge of the shape and behavior of the earth," says Dr. Munk.

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LARGEST BLIMP—The U. S. Navy's new ZPG-3W, believed to be the world's largest non-rigid airship, is shown on its maiden flight. Concealed within the envelope or "bag" is the largest revolving radar antenna ever carried by an aircraft. The blimp's capacity is said to be approximately 1,500,000 cubic feet.

MEDICINE

Refute Heart Ills Theory

► THE CURRENT scare labeling high blood pressure and arteriosclerosis as the occupational disease of the executive, may be unjustified.

A recent five-year study of more than 2,000 individuals showed executives had less hypertension and arteriosclerosis than did nonexecutive office workers of comparable sex, age and work environment, two New York doctors report.

Speculating on why executives showed no increased incidence of heart disease, the authors suggest:

1. Success in career may go hand in hand with success in health, i.e., the healthier go higher.

2. With greater financial income, the individual can afford a higher standard of living and perhaps more complete medical care.

3. The majority of executives are college graduates and some have advanced degrees. Therefore, they may have the education and insight to realize the importance of "escape valves" and hobbies.

An executive, Drs. Richard E. Lee of the New York Hospital-Cornell University Medical College, and Ralph E. Schneider, New

York University College of Medicine, say, is a person dealing with policy formation and implementation. The 1,171 male executives studied, ranged from "top executives" to "minor executives."

Also, 1,203 nonexecutives, stenographers, secretaries, clerks, assistant supervisors and supervisors, were studied. Of these, 563 were women.

Among the executives, 12.3% had some type of high blood pressure, compared to 15% of the male nonexecutives over 40 years of age. Arteriosclerosis of some type was found in 7.8% of the executives and 15.4% of the nonexecutives, the physicians report in the *Journal of the American Medical Association* (July 19).

Heart attacks occurred in 3.7% of the executives and 5.1% of the nonexecutive males over 40.

"One can therefore wonder," the scientists conclude from their study, "whether at least a part of the recent emphasis on dangers of executive life to the vascular system may be based more on knowledge of the exceptions rather than of the rule."

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GENERAL SCIENCE

Suggest Strange Weapons

► Hydrogen and atomic bombs are often thought to be the prime weapons of any future war, but an imaginative team of scientists has dreamed up the following possibilities for fifth-column weapons:

1. Germ warfare or psychologically debilitating agents used as warheads of missiles or as fifth-column weapons in lieu of nuclear armament.

2. Crop or animal poisoning of a cumulative and permanent type to create mass starvation, delivered by ecological chain reaction (poisoning of mice, bees, plants, etc.) or by aerial or wind dispersion.

3. Radioactive invisible paint to be fifth-column-applied by micro aerosols (very fine mist) to movie seats, subway seats, toilets, etc., to genetically deform and depopulate the enemy. Desired action: slow enough not to be discovered until too late. Alternative: radioactive strontium, etc., in public water supplies, cigarettes, gum, liquor, food, etc.

4. Narcotic addiction established by latent inclusion in aspirin tablets, popular candy, liquor, etc., with subsequent disclosure. Narcotic should be a new synthetic unknown to enemy or a natural substance.

5. Drug causing sterility after several exposures—tasteless, odorless, etc.—included in common pills, food items, etc., to bring about depopulation. Better yet: Include this in an infrequently used food product to defy detection.

6. Insect or rodent invasion of ecological chain reaction type to upset crop balance, or spread rabies, bubonic plague, etc.

7. Campaign of incendiary white phosphorus letters that burn when completely dry to destroy contents of mail boxes, post offices, airplanes, mail cars, etc., and disrupt communications. Letters cannot be identified as dangerous except by opening.

8. Corrosive lubricating oil to destroy power generators, turbines, locomotives, automobiles, machinery, etc. Two reagents used in separate batches of oil, so that after "priming" exposure, application of oil containing second chemical causes precipitous deterioration, but no evidence will appear until second chemical is added. A year might be devoted to "priming" all oil uses, followed by a three-month idle period, then by the trigger dose. Before damage could be arrested, the country would have to shut down either for want of clean oil or for want of operative machinery. The oil industry would be the first to be "triggered."

These were reported by a team of scientists, who used only publicly available information, in "Inspection for Disarmament" (Columbia University Press). (See p. 70.)

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PUBLIC HEALTH

Snails Clog and Unclog Sewage Plants

► SNAILS found in the trickling filters of a large number of sewage treatment plants are both a help and a hindrance to treatment operations, sanitary engineers have

found. By feeding on sewage slime organisms, snails are believed to keep spaces between filtering stones open and reduce the chance of clogging.

On the other hand, snails themselves have been found to clog pipes and their abrasive shells cause excessive wear on pumps. One treatment plant in Dayton, Ohio, reports an average of 1,200 pounds of snails per day leaving the filters and entering sewage settling tanks.

W. M. Ingram and W. B. Cooke, U. S. Public Health Service, Cincinnati, and L. T. Hagerty, division of sewage treatment, Dayton, report their findings in *Sewage and Industrial Wastes* (June).

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ECOLOGY

Study Species Relations

► A NEW THEORY may unravel some of nature's most complex secrets.

The presence of a type of plant or animal may depend more on other life in the same area than on soil and climate, Drs. John E. Cantlon, Michigan State University, and H. T. Odum, University of Texas, report.

Dr. Cantlon, associate professor of botany and plant pathology, said the theory stems from the scientifically well-known observation that the approximate number of types or species of life in a given wild area is predictable because they increase in a definite pattern.

"One section of an area," he explained, "may have 100 plants of ten species. A bigger section may have 1,000 plants and 20 species. A still greater section may have 10,000 plants and 30 species. If this pattern continues, we can predict that whenever the number of plants is multiplied by ten, the number of species is increased by ten."

"This proportion may not hold true for another area but a similar ratio will. In all cases, the number of species will increase in small quantities as the total life increases in large amounts."

Drs. Cantlon and Odum claim this proportion of species to total wild life is too constant to be mere chance; it must be due to dependence of some plants and animals on others. They call this a "quantitative dependency relationship."

Similar reasoning formed an earlier theory, claiming that a quantitative dependency relationship is involved in the fact there are more plants than plant eaters and more plant eaters than flesh eaters.

Drs. Cantlon and Odum go further by maintaining that there are dependency relationships among species as well as larger categories of wild life.

"The most common plants and animals probably have the least dependency relationships," Dr. Cantlon said, "but rare ones may rely on many species in order to exist."

Dr. Cantlon explained the theory by comparing it with the way men depend on other men.

"In a small community, there are fewer occupations than there are in big cities. Before a specialized person can make a living, he must have a certain number of patients, clients or customers."

"Therefore, a village may not have a lawyer but a city will have many. Lansing can not support a subway engineer but New York needs several."

"Since there is a similar proportionate relationship in nature between species and total life, we are theorizing that different species depend on each other in much the same manner that humans depend on other humans."

To avoid the complexities of an overall study, Dr. Cantlon confines his research to

statistical sampling of plants in specific natural areas.

He collected data in northern Alaska last year under the sponsorship of the Arctic Institute of North America.

The climate and topography of vast amounts of wild land there are ideal for his studies. Within an area of a few square feet, he can find a great variety of growing conditions and plant groups.

He studies these groups to determine the amount of plants, number of species and the frequency with which two or more species grow in the same area.

"If two species tend to grow together more frequently than similarities in environment would infer, there may be a dependency relationship," Dr. Cantlon said.

"There may also be many indirect relationships where two species are linked through their relationships to several other species."

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CHEMISTRY

Exotic Fuel Ingredient Helps Make Older Fuels

► THE BASIC ingredient of modern "exotic" jet fuels can make possible faster and easier production of a more conventional fuel known for many years.

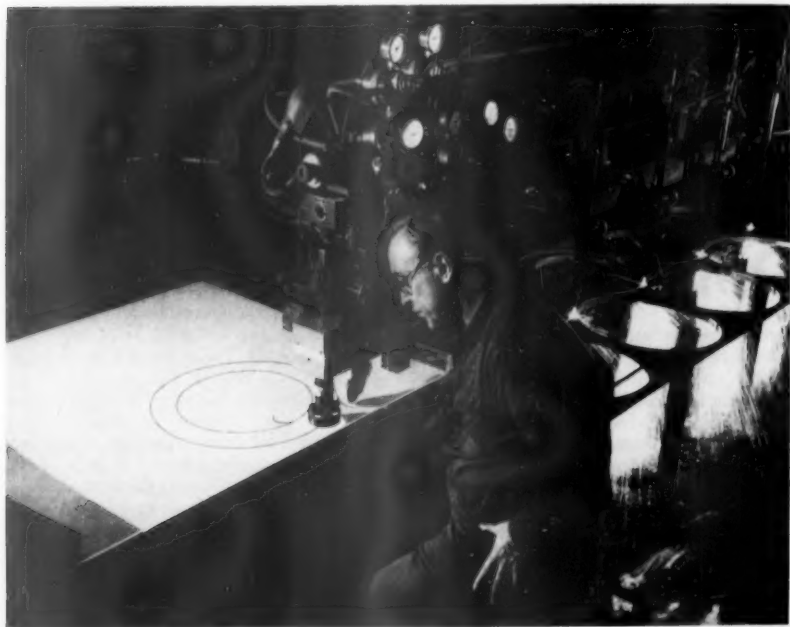
Diborane, a gaseous compound of boron and hydrogen and the starting point for exotic boron-based chemical fuels, has been found to increase considerably the speed and ease of conversion of natural acetylene to benzene. This is a chemical often used as an aviation fuel, as an ingredient in other fuels, and as a starting point for many important plastic and synthetic rubber processes.

By itself, diborane has no catalytic or rate-changing effect on the process, but alters the normal silica-alumina catalyst so it is much more effective, H. G. Weiss and Dr. Isadore Shapiro, Olin Mathieson Chemical Corporation research laboratory, Pasadena, Calif., report in *Journal of the American Chemical Society* (July 5).

A catalyst is a substance that alters the normal rate of a chemical reaction without the appearance of having entered directly into the reaction. The positive, or "rate-increasing," catalyst usually used in converting acetylene to benzene is a silica-alumina mixture that may be considered a mixture of purified sand and aluminum ore.

Silica-alumina often is "poisoned" by accumulations of process ingredients on the catalysts. The presence of diborane apparently eliminates poisoning, allowing the catalyst to last longer, besides speeding the reaction rate. The presence of diborane also allows this important reaction to take place at temperatures much lower than normal, the chemists report, thus making the process easier to conduct on a commercial scale.

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ELECTRONIC EYE—An electronic tracer that can automatically direct a battery of gas cutting torches through intricate cutting patterns is being operated by Carl Anderson, a Westinghouse Electric Corporation worker. The device utilizes a vibrating photo-sensitive cell to follow accurately a pencilled drawing or pattern. It is capable of following any pattern at speeds up to 30 inches per minute without loss of accuracy.

Astronomical longitudes and latitudes are obtained by observing the positions of celestial bodies with respect to the direction of gravity.

PUBLIC SAFETY

A-Inspection Would Work

► **DISARMAMENT** inspection systems can be made workable.

This finding and the methods for making disarmament inspection work should strengthen the hand of U.S. scientists in Geneva who are trying to reach an agreement with their Russian counterparts on the possibilities of detecting violations of any future bans on atomic and hydrogen bomb tests.

More than 50 U.S. scientists and other specialists, working in this country and using only publicly available information, investigated possible methods of inspection and how these could be evaded. They concluded a workable system could be devised, reporting their findings in the book "Inspection for Disarmament."

The range of workable inspection methods extends from particular, limited objectives, such as halting nuclear bomb and missiles tests, to complete disarmament.

Six general methods for use by an international inspection force were evaluated. The techniques were called general because they are not specific to any particular weapon.

The six are:

1. Aerial inspection to check industrial and military installations and to detect the massing of large military forces.

2. Monitoring of governmental budgets to determine any diversion of large sums to secret uses.

3. A minimum network of seven ground stations within the U. S. and 25 in the Soviet Union, equipped with appropriate instruments for detecting acoustic and seismic waves, electromagnetic radiation and radioactivity, in order to catch tests of nuclear bombs with explosive power at least as great as a World War II block-buster bomb. Each

station would be so located that no point within a country would be more than 300 miles from it. The same network could be used to control agreements on high altitude missile tests by adding appropriate radar equipment, and the stations could then serve as the nucleus of a system of air traffic control.

4. Radiation inspection through the medical control systems already in operation to protect personnel working in plants producing fissionable materials.

5. Concentration of scientific and technical personnel to locate clandestine production sites.

6. Inspection by individuals who would report infractions.

To check on the feasibility of these systems, three groups were established for devising strategic plans for evading possible disarmament agreements. These evasion teams found that successful clandestine production, under the eyes of an inspection organization, would be very difficult. They also concluded that evasion would become more difficult as international tensions were reduced and, therefore, urged early disarmament steps, even though partial.

The entire investigation was organized by Dr. Seymour Melman, associate professor of industrial and management engineering, Columbia University.

At Columbia, the research was conducted as part of the program of the Institute of War and Peace Studies under a grant from the Institute for International Order of New York, of which Earl D. Osborn is president. The book is published by Columbia University Press as a public service to make possible informed discussions on a vital public issue. (See p. 68.)

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test detectability need any longer be a governing point."

Explosions, it pointed out, could be sufficiently detected in the following ways:

Low altitude tests could be detected by air sampling, fallout, electromagnetic, seismic shock, air blast, and other techniques.

High altitude tests, hundreds of miles up, probably could be detected by the electromagnetic radiation emitted.

Underground tests larger than five kilotons are detectable by stations strategically located.

Underwater explosions could probably be detected by seismographs on land and hydrophones on islands or ships spaced thousands of miles apart.

Experience from installing and testing the detection network would probably make smaller weapons detectable in the future.

In addition, the committee names other reasons for its advocacy of nuclear control. One of them was that tests by Russia and, more particularly, other countries, are more likely to reduce U. S. security than U. S. tests are likely to improve it.

A second reason was that the U. S. now has adequate small bomb technology against massed conventional attack.

The National Planning Association, located in Washington, D. C., is an organization of business, labor, agricultural and professional leaders devoted to planning for the future of America.

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NAVIGATION

Small Boat Owners to Get Nautical Charts to Fit

► **THE SMALL** boat owner will soon stop wrestling with nautical charts bigger than his cabin.

Rear Adm. H. Arnold Karo, director of the Coast and Geodetic Survey, has announced that more than 7,000,000 owners of small craft will soon have a new series of nautical charts especially designed for cramped quarters. In addition, the series will be generously supplied with descriptive details heretofore found only in special publications. An experimental edition is already planned for the Potomac River area from Washington, D. C., to its mouth, about 95 miles distant.

Survey officials have not yet agreed upon optimum chart size, and are seeking advice from potential users. Current suggestions range from standard page size up to 17 by 26 inches, but the Bureau wants more information before making up its mind.

Other questions the Survey wants answered are:

1. What type of descriptive information should be included?

2. Should this be printed on the back or included separately?

3. Should charts be folded, in a portfolio, or in packet form?

All suggestions for the new series should be sent to the Director, Coast and Geodetic Survey, Washington 25, D. C.

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PUBLIC SAFETY

Nuclear Test Policy

► **THE UNITED** States should lead the way to international control of nuclear test explosions, a National Planning Association committee has urged.

The committee said cessation of these tests will help lessen world tensions and war nerves and at the same time will transfer international competition to more peaceful and fruitful areas.

"We have full confidence," the group declared, "... that the resources of freedom—intellectual, political, ideological, human, and economic—can meet this (peaceful competitive) challenge."

Specifically, the NPA committee called for:

1. Immediate establishment of an international agency to operate a monitoring system for the maximum practicable control of nuclear explosions.

2. Proposal of an early date for a confer-

ence to reach international agreement on installation and proving of a monitoring system, development of nuclear "dynamite" for peaceful uses and for other purposes, and prohibition of nuclear explosions which could be identified by the monitoring system, except when such tests are authorized.

3. Delay of all nuclear explosions (after the current U. S. series) for two years while negotiating the two previous points.

Factors considered in arriving at its recommendations were summarized by the committee as human values, military security, security through arms control, and explosions for agreed purposes.

Notwithstanding the recent Geneva Conference between Western and Russian scientists on scientific means to monitor nuclear tests, which concentrated on detection of nuclear explosions, the NPA stated that it "does not believe that the matter of

SURGERY

Surgery Saves Infants

Surgery to correct malformations in infant intestines has met with success due mainly to early diagnosis and prompt treatment of the condition.

► **SURGERY** performed right after birth is saving the lives of a large number of infants born with obstructed intestines.

Successful treatment now allows most of the affected infants the prospect of a normal life, reports Dr. David B. Sheldon of the University of California at Los Angeles Medical Center.

These malformations once took the lives of most babies born with them.

The increasing survival rate is due mainly to two factors, Dr. Sheldon points out. One is early diagnosis and the other is prompt treatment. The early diagnosis depends on the type of obstruction and abilities of the doctors attending the births.

As for the promptness of treatment, newborns tolerate surgery better than do babies a few days old. The malformations causing the blockages grow more set and difficult to work with as they become older.

Present day anesthesia methods, treatment with fluids, and antibiotics are increasing the success of early surgery.

Dr. Sheldon believes that anesthesia in the young patients is fully as important as the operation. Since infants are highly susceptible to respiratory complications, a good deal of thought should be given to selection

of an anesthetic. It should not interfere much with the intake of oxygen nor stimulate the secretion of mucus in the respiratory tract. The anesthetic most frequently used, according to Dr. Sheldon, is cyclopropane.

Another important factor in this type of surgery is the combination of a large amount of water in the tissues of newborns and the inability of their kidneys to get rid of excess fluids. Tolerance to excessive fluid administration, particularly saline solution, is very limited. Lost blood during operation must be accurately measured and replaced.

Another of the techniques giving babies a new lease on life is the use of a humidified atmosphere rich in oxygen. This tends to prevent the formation of dried mucus plugs that may be caught in the bronchial tubes. And antibiotics help combat infection in the delicate young lungs.

Although many of the small patients with the intestinal problems are born prematurely and often have more than one malformation, their chances for survival are increasing all the time, Dr. Sheldon reports in *California Medicine* (March), official journal of the California Medical Association.

Science News Letter, August 2, 1958

GEOPHYSICS

Measure Antarctic Ice

The greatest ice depth recorded, 14,000 feet, has been recorded in Antarctica, which has been found to be covered by an ice sheet that averages 8,000 feet in thickness.

► **ANTARCTICA** is covered by a sheet of ice that averages 8,000 or more feet in thickness. At one point on the vast white continent United States International Geophysical Year scientists measured a thickness of 14,000 feet, the greatest ice depth ever recorded.

These findings are reported in the *IGY Bulletin* (July) of the National Academy of Sciences by Dr. George P. Woollard of the department of geology, University of Wisconsin, Madison, Wis.

Based on preliminary data gathered by scientists of many nations during the past year, the thickness studies also show that the underlying bedrock surface is quite irregular and that the bedrock material is probably a complex of igneous rocks.

A wide variety of scientific techniques were used to measure ice thickness, including glaciology, seismology, gravity, magnetism, submarine geology, photo-geology and visual observation.

What is beginning to result from this mass attack on the Antarctic's ice thickness is a profile not only of its surface, but of the land and water masses buried thousands of feet under the surface ice.

The Palmer Peninsula, for example, is now thought to extend beneath the ice as an island, separated by a strait from Antarctica proper.

In addition to the profile of the continent, the ice thickness studies promise to provide other scientific data.

It sheds light, Dr. Woollard says, on the glacial history of the Antarctic continent. In a broader sense, it may reveal much of relevance to past and present world climatology.

In a very different area, he states, measurement of the flexure of the earth's crust under its enormous load of ice should yield data on crustal strength.

"There are," Dr. Woollard points out, "practical as well as scientific considerations

in studying the thickness of the Antarctic ice cap, as well as the Greenland, Ellesmere Island, Baffin Island, and other ice caps.

"If substantial portions of the Antarctic ice cap should melt, the volume of water released would profoundly influence sea level; some coastal cities might be completely submerged or develop into counterparts of Venice, with canals marking former streets."

In fact, Dr. Woollard says, surveys indicate certain former ice cap centers, such as Canada and Scandinavia, are rapidly rising, and many seaport towns that flourished when Rome was a world power are now marked only by their submerged ruins.

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TEST TOWER—The rain-erosion test tower, recently erected at the B. F. Goodrich Company Research Center, Brecksville, Ohio, is shown here along with the rotor blade.

TECHNOLOGY

Rain-Erosion Tower Tests Aircraft Parts

See Front Cover

► **AN AIRCRAFT** engine anchored within a reinforced concrete rain-erosion test tower in operation at The B. F. Goodrich Company research center now spins a rotor blade through man-made rainstorms, exposing resistant materials to the impact of raindrops.

At 600 miles an hour, a raindrop becomes a weapon, striking with the muzzle velocity of a bullet fired from a .45-caliber pistol.

The photograph on the cover of this week's *SCIENCE NEWS LETTER* shows a view from the top of the test tower with the rotor blade installed and ready for a test spin. A technician applies a rubber sample to the leading edge of the blade. A ring of spray nozzles which create raindrops is suspended by pipe from the top of the tower. In a 20-foot fall to the base of the tower, the stream changes to fully developed raindrops of a controlled size.

Erosion-resistant materials are needed for jet-age rubber de-icers and radome covers.

Science News Letter, August 2, 1958

PHYSICS

Analyze Phone Voice to Find Recognition Factors

► HARVARD UNIVERSITY scientists are breaking down the sound of a voice as heard over the telephone to show what it is that enables you to distinguish the voice of your boss from that of your wife or mother-in-law and to recognize whether the speaker is happy or upset. This new job is being undertaken at Harvard's Division of Engineering and Applied Physics.

It is hoped this analysis will also show why a word sounds like the same word when spoken by a bass voice or by a soprano. The new analysis breaks sound into a new kind of element called a damped curve, described as "dying away like the vibration of a plucked guitar string."

Once the sound is separated into its components, the components can be studied to determine which of them are significant in recognition, and to show which of them remain constant in different voices speaking the same word.

A possible application of the research is machine recognition of speech. The day is foreseen when you can give your number orally to a dial-less dial telephone and when you can dictate your letters direct to a listening typewriter.

A second possible application is the saving of channel space on long-distance telephone lines. The man talking to a business associate in Europe wants to hear his words clearly but he does not need to hear the sounds that tell him that his associate is angry or has a bad cold.

If a telephone system were built which carried only the minimum required message, about a hundred times as many telephone calls could be sent over the same wire.

The research project is being conducted by Ladislav Dolansky, a candidate for the doctor's degree, working under the supervision of Prof. Dwight Wayne Batteau.

Science News Letter, August 2, 1958

ZOOLOGY

Debate Legislation Affecting Wild Ruminants

► THE GIRAFFE as well as the vicuña may be on his way to becoming an undesirable alien, either not permitted to enter the United States or assigned to an Ellis Island for animals instead of a zoo.

Testimony has been heard by the Senate subcommittee on agricultural research and general legislation to decide the fate of imported wild ruminants such as wild goats, cattle, and giraffes. Should they be kept out, put in quarantine, or permitted free entry?

U.S. Department of Agriculture livestock experts say exclusion may be a necessary step to protect the nation's livestock against the dread foot-and-mouth disease.

Representatives of zoos and animal farms, who depend on the animals for their exhibits, point out legislation barring the wild ruminants would discriminate unfairly against zoos. Also they point to the fact

that since 1890 no U.S. outbreak of foot-and-mouth disease has been traced directly to a wild animal.

Legislation already passed by the House of Representatives, H.R. 12126, would put the wild ruminants under the same rulings as domestic cattle and sheep: no importing of animals from countries where there is foot-and-mouth disease.

Strict quarantine measures and research costing millions of dollars have kept the nation's \$10 billion livestock industry free of this disease, despite major outbreaks in Mexico and Canada.

One proposal, made by Dr. Leonard Carmichael, secretary of the Smithsonian Institution, may be acceptable to both groups. His suggestion would give the Secretary of Agriculture the authority to establish regulations governing the quarantine and importation of wild ruminants. It would also provide for defining an "approved zoo" where the animals could be kept and exhibited. Now only publicly administered zoos are "approved" and standards of qualifications for approval are vague.

USDA experts say that any legislation may very likely be temporary, however, because research on foot-and-mouth disease may soon lead to methods of diagnosis and detection that would eliminate lengthy and costly quarantine.

Science News Letter, August 2, 1958

ENGINEERING

Air Replaces Oil for Bearing Lubrication

► AIR IS replacing oil for the lubrication of bearings in many machines and instruments.

A lubrication idea more than 100 years old has gone into routine practice on a variety of instruments. It is also finding specialized uses on some machines, Manfred Wildmann, Autonetics Division of North American Aviation, Inc., Los Angeles, reported to the American Society of Mechanical Engineers meeting in Detroit.

By floating bearings on a thin layer of air or other gases instead of on a film of oil, engineers have been able to eliminate much cleaning and maintenance of machinery designed for long, uninterrupted operation.

Gaseous lubrication can be accomplished by two methods, Mr. Wildmann said:

1. Air or other gases are injected at high pressure around the bearing.

2. "Normal hydrodynamic action" is utilized. This method of gaseous lubrication relies on the wall of air that builds up in front of a rapidly rotating bearing.

Neon and helium, as well as air, have been used experimentally, Mr. Wildmann said. Air bearings already have found use in memory devices for digital computers and in high precision gyroscopes, he said.

Lazar Licht of the Franklin Institute, Philadelphia, suggested gaseous bearings for use in machines sensitive to contamination from lubricating oils, and in radioactive atmospheres where ordinary lubricants tend to break down.

Science News Letter, August 2, 1958

IN SCIENCE

ZOOLOGY

Rare Goat Specimens Brought From Japan

► AN ANIMAL so rare that it is known as a "national monument" in its native land, Japan, has been brought to this country for study.

Three specimens, including two females and one fetus, of the Japanese serow, a small, shaggy, hoofed mammal that somewhat resembles a Rocky Mountain goat, have been received by the American Museum of Natural History, New York. The animal is so shy and wary that in two months of hunting a Museum expedition saw only three serows.

Permission to hunt the rare goat-antelope is seldom given by the Japanese Government which has a program to conserve the species. Population estimates of the serow, or *Capricornis crispus*, range between 3,000 and 30,000.

It lives in the sub-alpine forests of Japan at elevations as high as 7,000 feet. Blackish-brown in color, the serow has tapered black horns. The specimens will not be exhibited at this time, Hobart M. Van Deusen, assistant curator of the Museum's department of mammals, reports.

Science News Letter, August 2, 1958

SURGERY

New Surgical Technique Enlarges Bladders

► URINARY BLADDERS shrunken as the result of disease or chemical injury can be enlarged by a new surgical technique.

Dr. Willard Goodwin of the University of California at Los Angeles Medical School described the new technique, which involves use of a segment of the small intestine, before the American Urological Association meeting in New Orleans.

Dr. Roderick D. Turner and Dr. Chester C. Winter cooperated in development of the new technique.

In the procedure, known as the "cup patch" operation, a segment of the ileum is removed and cut lengthwise so that it lies flat. The edges are sewn together so as to form a cup or patch, which is then sewn to the bladder. When healed the bladder and patch act as a unit in voiding the urinary bladder.

Chief advantage of the method, the doctors said, is that it leaves no residual urine, such as may occur in other types of operations using the ileum to enlarge the bladder.

The new technique has been used in 17 cases by UCLA surgeons. Results are promising, especially in cases involving such bladder disorders as interstitial cystitis, tuberculosis of the bladder and chemical injury of the organ.

Science News Letter, August 2, 1958

ICE FIELDS

ARCHAEOLOGY

Scientists in Middle East Find Language Link

► THE MIDDLE EAST is yielding more than just world tension these days. This is evident from a report that American archaeologists in Turkey have unearthed an important link with the past.

Digging at Sardis, a site 50 miles east of Izmir, Turkey, and once the capital of wealthy King Croesus, the American scientists found an inscription in the little known Lydian tongue.

This is believed to have been the language of Croesus' kingdom in the sixth century before Christ. The Lydian inscription was found incised on a fragment of a pottery vessel.

American archaeologists from Harvard University and Cornell University began digging at the site in June seeking to uncover the ruins of Sardis, once a major world capital.

Each new inscription is a major aid in progress toward understanding the Lydian tongue, Prof. George M. A. Hanfmann of Harvard said. Some scholars believe it to be related to the language of the Hittites, who flourished in Asia Minor more than 700 years before Croesus.

The joint Cornell-Harvard Expedition is being sponsored by Cornell University, the Fogg Art Museum of Harvard, and the Bollingen Foundation under the auspices of the American Schools of Oriental Research. It is a five-year program, during which time the archaeologists hope to uncover a large building that may prove to be the palace of Croesus, the man who gave the modern world the expression "rich as Croesus."

The pottery fragment is the first fruit of the Expedition's work.

Science News Letter, August 2, 1958

ZOOLOGY

Tiny Bat Brain Tells Information From Noise

► A BAT'S BRAIN, weighing only a small fraction of an ounce, can pick out sounds needed for safe flight even when there is loud surrounding noise.

The bat can dodge wires less than three-tenths of a millimeter in diameter while loud noise "jams" the faint echoes bounced back by the wires.

Apparently, the bat brain contains a highly efficient data processing mechanism, Dr. Donald R. Griffin and Alan D. Grinnell of Harvard University's biological laboratories in Cambridge, Mass., report.

It seems conservative to conclude that bats can hear echoes that are at least 35 decibels below the level of surrounding noise, the scientists report in *Science* (July 18). Experiments show further that this

ability must involve "selective recognition" of the echoes.

Possibly, the scientists suggest, characteristics of the echoes such as their pulses, frequency sweep, and the time relations between the bats' emission of a sound pulse and the arrival of echoes, may aid the bat in this "impressive auditory discrimination."

In experiments, individual long-eared bats or *Plecotus rafinesquii*, were flight-tested in a room containing wire obstructions. Four staggered rows of 28 wires, ranging in size from about 1.5 mm to 0.28 mm diameter, were arranged so the bats had to fly a zig-zag course to avoid merely chance misses in collisions. Thermal or "white" noise was generated by electrostatic loud-speakers.

It is unlikely, the scientists report, that the bats learned the position of the wires. Variations in noises themselves also do not seem to be the way the wires are detected. To test this, paper muzzles were put on the bats. This cut down their obstacle avoidance to the chance level.

When blinded, one bat even outperformed some of his fellows in avoiding one of the smaller wires during a "noisy" trial. The wire provided echoes well below the noise level.

Science News Letter, August 2, 1958

ROCKETS AND MISSILES

Rocket Launching Pads Will Present Problem

► LAUNCHINGS of nuclear-powered intercontinental ballistic missiles and space rockets will involve the same type of radiation hazards as encountered in actual weapons tests, the joint Congressional Committee on Atomic Energy was told in secret testimony recently released.

Many radioactive fuel elements, probably in gaseous form, are expected to spew from the nozzles of nuclear rockets and contaminate the launching pads, Dr. Raemer Schreiber of the Los Alamos, N. M., Atomic Energy Commission testified Jan. 22, 1958.

For this reason, and because accidents could cause the reactor engines to "fall apart, not explode" and release all their fuel into the launching area, Dr. Schreiber said it will be necessary to use launching pads "which you do not expect to use again for several months."

Such pads, he said, "can be located on centers that are not perhaps more than a half a mile apart, but you do have a problem of remote firing and of having a local contamination at the time of launching."

Such "blast-off" radiation will be much smaller than that encountered in tests of our smaller nuclear bombs, he said.

It is also possible, Dr. Schreiber told the Subcommittee on Outer Space Propulsion, that by the time we are ready to use nuclear engines in ICBM's and rockets, the reactors may have been perfected so that none of the radioactive fuel spews from the rear.

However, he stressed, there still will be the problem of neutron-activated steel, ground and concrete at the launch pads. It will take perhaps a few months "decay time" for this effect to wear off.

Science News Letter, August 2, 1958

ORNITHOLOGY

Emperor Penguin Mother Gets 9-Week Vacation

► ONCE THE female emperor penguin lays her single egg, she takes off for a nine-week vacation at sea while the male incubates the egg.

She returns, however, just in time to help feed her newly-hatched offspring.

This was revealed in studies of the feeding habits of this unusual Antarctic bird made by Richard L. Willing, of the Antarctic Division of the Australian Department of External Affairs, Melbourne.

The young penguins grow rapidly, as do their appetites, Mr. Willing says, causing both parents to work hard at bringing their only chick food.

The adult emperor penguins depend on feeding holes or tide cracks for their food supply. Glacial movement keeps the cracks open, enabling the penguins, which gather at them in large numbers, to gorge themselves on fish and small animals and plants known as krill.

An interesting fact, he says, is that the birds do not feed for very long at these holes. The onslaught of many hungry birds, he suggests, depletes the feeding hole larder and the birds move on to another.

Once back at the homestead the mother and father penguins regurgitate the food for the chick.

Mr. Willing, who reported his studies in *Nature* (July 19), points out that the female emperors apparently travel far out to sea during their nine-week vacation because they are never seen near the coast.

Science News Letter, August 2, 1958

PUBLIC HEALTH

Cautions Against Hot Weather Food-Poisoning

► THE HOT summer season brings with it the increased chances of food poisoning.

Special precautions that can be taken to preserve foods safely are suggested by Dr. Herman E. Hilleboe, State Health Commissioner for the State of New York.

1. Meats, poultry, salads, pie fillings and sauces should not be kept at room temperature. They should be kept at 50 degrees Fahrenheit or lower.

2. Since not all bacteria causing food poisoning can be destroyed by cooking the food, the best method of preventing food poisoning is to make certain bacteria contamination does not occur and that bacteria growth is not encouraged by storing under improper conditions.

3. Avoid cream sauces when preparing salads during hot weather. If a sauce is used, it should be kept under refrigeration until the salad is ready to be served.

4. Keep left-overs under refrigeration at all times.

5. Avoid handling food if you have a cold or if you have a sore on your hands.

6. Keep cooking utensils and dishes thoroughly washed.

Science News Letter, August 2, 1958

TECHNOLOGY

Flying Flame Thrower

A new era of transportation and sports is being opened by "Buck Rogers" flying belts that may help men outrun horses, jump high walls and wide ravines.

By DAVID PURSGLOVE

► ON A FOOTBALL Saturday morning in the fall of 1940 a portable flame thrower was demonstrated to cadets of the U. S. Military Academy, West Point, N. Y. The excitement of the big game only a few hours away obscured a small incident and a brief exchange of remarks that may be recorded in history as a major turning point in modern warfare.

Within a few years, or perhaps even only a few months from now, top officers who witnessed that demonstration as cadets will be directing the use of almost unrecognizable modifications of World War II flame throwers in a new and fantastic kind of "ground" warfare.

Many of those cadets soon will be retiring after 20 years' service and they, at middle age, will be able to join even much older civilian friends in hiking, skiing, mountain climbing and even foot-racing, all without tiring, thanks to "flame throwers" strapped to their bodies.

Some of those officers will join private business and they may even commute from home to work through the air and without airplanes, but with the aid of flame throwers that have become flying belts.

The device, which Army and civilian engineers believe "will give the foot soldier the greatest element of surprise and maybe the greatest tactical advantage ever introduced into warfare," is the "Buck Rogers" personal rocket belt recently disclosed to the public. (See SNL, June 7, p. 358.)

Flying Belt

When it reaches its perfected state, which will require about two years' work, the Buck Rogers will be a true flying belt similar to that worn since 1933 by the comic strip character. It will allow soldiers to travel several miles at a choice of altitudes, change direction at will, and land safely.

Already test models are starting to live up to their name, and have surpassed the implications of the project name, "Grasshopper."

Early units have allowed men to run at a rate of 35 miles per hour for several seconds without tiring; jump trenches 20 feet wide from a running start; broad jump 11 feet from a standing-in-place position; rise eight feet into the air from what had been a standing position.

In only a few months of actual working time, preceded by a series of conferences, this age-old dream of science fiction writers was forced into reality by a group of imaginative young engineers at Reaction Motors Divi-

sion, Thiokol Chemical Corporation, Den-
ville, N. J.

Their only starting material was what some persons have called a "pipe dream" of the very green Corps of Engineers second lieutenant who tried to stir up interest in the workings of a flame thrower while his audience was more concerned with the possible outcome of the impending football game.

Charles M. Parkin Jr., now a lieutenant colonel at Fort Belvoir, Va., was the officer whose imagination was excited by a near accident and chance remark. The enlisted man who caused the incident remains only a face, but not a name.

In those days, flame throwers consisted of two large tanks, one of fuel oil and one of compressed nitrogen to provide pressure on the oil, a spark mechanism to create a tiny flame from hydrogen contained in a small tank, hoses, a pipe and a nozzle.

At the end of the first demonstration sev-

eral enlisted men helped the lieutenant strip down the equipment, clean it and then reload the tanks in preparation for the next class.

One of the men—Col. Parkin recalls that he probably was a sergeant—inadvertently turned the valve on a tank that already had been filled with nitrogen. As he hastily closed the knob on the hissing gas, he turned to the then Lt. Parkin and asked, "What do you suppose would happen, Lieutenant, if I opened this thing all the way?"

Project From a Pipe Dream

The lieutenant thought about it for a moment, then answered, "Well, I guess it could go skittering across the field, but it would be too risky to try it here."

"Then you mean," the soldier said, "that if I put a lot more gas in here—really build the pressure way up—I could hang onto the tank and maybe go flying?"

The soldier's idea was, of course, somewhat over-ambitious, but the thought plagued Lt. Parkin for many weeks. Finally, he had an opportunity to test the possibility of individual rocket propulsion at Fort Belvoir.



REAL-LIFE BUCK ROGERS—A gully 20 feet wide and five feet deep is jumped without strain by Reaction Motors' test stand assistant Ed Kurczewski wearing an early model of a Buck Rogers belt. Present models, still under wraps, are smaller, lighter and more efficient.

He first strapped one of the heavy tanks of highly compressed nitrogen on his shoulders. Then, just before he was ready to turn the slow-acting hand valve, it occurred to him that with the tank strapped so high on his body he might simply be thrown on his face.

He lowered the tank closer to the body's center of gravity near the hips. Then, after slowly turning the hand valve until it was fully open, he made a standing broad jump.

The jump measured 11 feet. Then he jumped several times without the tank on his back. The best he could do was slightly over eight feet.

Then there was only one logical train of thought: "If I can considerably increase my jumping distance with this heavy tank and slow valve, how much greater would be the effect with a much lighter tank, an immediate action release valve and greater thrust—perhaps from a small chemical rocket?"

During the years that followed, Col. Parkin found himself stationed in all parts of the world. He never forgot about the Buck Rogers rocket. On subsequent tours of duty at Fort Belvoir he was able to make further tests, mostly on his own time and at no expense to the Army.

Interest Aroused

Finally, in 1955 and with the help of civilian scientists at Fort Belvoir, Col. Parkin was able to interest the commanding officer of the Engineer Research and Development Laboratories.

Col. H. F. Sykes Jr., recently retired and now with the Chrysler Corporation's missile division, granted permission for Col. Parkin to investigate the idea on a limited scale. However, the Laboratories never officially picked up "Buck Rogers" as a formal project.

On trips to the Infantry Board at Fort Benning, Ga., and to the Armored Board at Fort Knox, Ky., Col. Parkin was able to discuss the project's feasibility.

He also visited four private companies to feel out their interest. Two of the companies submitted proposals only on paper. One company, Bell Aircraft Corp., Niagara Falls, N. Y., is believed to be working on a Buck Rogers to be revealed shortly.

The fourth company, Reaction Motors, Inc., which recently merged with and became a division of Thiokol Chemical Corporation, examined the problems in conferences, liked what they saw, and, without waiting for Army funds, assigned engineers Harry W. Burdett Jr., Alexander H. Bohr and Raymond Wiech the task of making practical hardware from the basic idea.

Their work was successful and they now believe that, given two years from such time as the Army may accept their work as a formal project, the Buck Rogers will be in every sense a "true flying belt."

Buck Rogers Commuters

The biggest job now is to make the belt, with its rocket fuel tanks and jet nozzles, small, light, cheap and simple enough for general issue to all troops as they enter the Army.

If that can be done, and the Thiokol engineers are sure it can, it means the device will meet the major marketing requirements for civilian use.

They readily agree to all the most obvious civilian uses for the Buck Rogers: short-range transportation, police work, fire fighting, skyscraper or bridge construction and emergency messenger or delivery service.

However, the biggest civilian potential the engineers see for their rocket belt lies in sports.

"Just think," Mr. Burdett suggested, "about all those good hills for skiing where there are no ski tows, but where a fellow can still enjoy himself because he carries his own rocket-propelled tow strapped to his waist."

The Buck Rogers probably will be able to aid most existing sports, but the engineers believe its greater influence may be in creating entirely new sports still unheard of.

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RADIO

Saturday, August 9, 1958, 1:30-1:45 p.m. EDT. "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Frank J. Rogers, general manager and chief engineer, Commercial Electronics Division, The Admiral Corporation, Newark, N. J., will discuss "Closed Circuit Television."

ANTHROPOLOGY

Porcupines Gnawed on Stone Age Man's Tools

► RAZOR SHARP edges on some of the bone chisels of Middle Stone Age man in Africa were found to have been put there by the needle-sharp front teeth of porcupines, Dr. Raymond A. Dart of the University of the Witwatersrand, Johannesburg, South Africa, reports.

But the fact that a magnifying glass showed up the telltale marks of rodent teeth on the Stone Age tools does not mean that ancient man himself did not do the original work in splitting and shaping the animal bones.

At the Kalkbank Stone Age campsite in the Central Transvaal, 3,619 bone fragments were collected. Of these, 903 had been gnawed by porcupines.

"The first fact that emerges from the Kalkbank deposit," Dr. Dart stresses, "is that porcupine gnawing, even when it affects 24.95% of the bones in a deposit, does not prove that porcupines collected or split the bones that they gnawed."

Three of the bone pieces found at Kalkbank were big leg or foot bones of a giraffe. The bones were so huge that the Stone Age Man who split them had to use a stone axe or some other sharp, handled stone.

These giraffe bones show no sign of having been gnawed by an animal, but they do show clearly the marks of the stone axe. One of the bones had also been hacked at one end to form a chisel or gouge-like edge.

The evidence of both human and animal working on ancient bone tools is reported by Dr. Dart in the *American Anthropologist* (Aug.).

Science News Letter, August 2, 1958

OPTICAL BARGAINS

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADMINISTRATION OF RESEARCH: Proceedings of the 11th National Conference—Robert W. Cairns and others—*Pa. State Univ. Press*, 163 p., paper, \$4.50. Conference discussed the problems of the individual scientist and the organization of basic research.

THE ALEUT DENTITION: A Correlative Study of Dental Characteristics in an Eskimoid People—Coenraad F. A. Moorrees—*Harvard Univ. Press*, 196 p., illus., \$4.50. For the odontologist and physical anthropologist, utilizes data gathered during a field survey in 1948.

AUTOMATIC AND SEMIAUTOMATIC PRODUCTION OF ELECTRONIC PACKAGED SUBASSEMBLIES—A. A. Lawson—Melpar for Bureau of Ships (*Office of Technical Services*), 58 p., illus., paper, \$1.50. Final report on the Navy's automated "Mini-Mech".

BAILLIERE'S ATLAS OF MALE ANATOMY—Rev. by Katharine F. Armstrong, foreword by Sir Cecil Wakeley, illus. by Douglas J. Kidd—*Bailliere (Williams & Wilkins)*, 4th ed., 34 p., 7 plates, \$3.25.

BUILDING CHILDREN'S SCIENCE CONCEPTS: Experiences with Rocks, Soil, Air, and Water—Mary Sheckles—*Teachers College*, 138 p., illus., paper, \$1.50. Emphasis is on carefully planned experiences to help children develop a "feel" for the forces around them, learn to do straight thinking about them, and develop a social conscience with respect to them.

CAREERS IN INDUSTRIAL ENGINEERING: Opportunities, Preparation Required, Where Employment is Found, Scholarships and Fellowships, Advantages, Disadvantages—Juvenal L. Angel—*World Trade*, 26 p., paper, \$1.

CAREERS IN THE SOCIAL SCIENCES: Areas of

Specialization, Training, Opportunities, Where Employment is Found, Advantages, Disadvantages—Juvenal L. Angel—*World Trade*, 26 p., paper, \$1.

CENTRALIZED INFORMATION SERVICES: Opportunities and Problems—Allen Kent and James W. Perry—*Western Reserve Univ. Press (Inter-science)*, 196 p., paper, \$5. Analyzes results of eight surveys investigating the advantages and feasibility of centralized and cooperative information services.

THE CEREBRAL-PALSED CHILD: A Guide for Parents—Winthrop M. Phelps, Thomas W. Hopkins and Robert Cousins, foreword by Frances R. Horwich, introduction by Dean W. Roberts—*Simon & Schuster*, 237 p., \$3.95. Tells the medical facts you should know, and where to go for help—medical, educational, social.

DESIGN FOR MENTAL HEALTH—Margaret M. Farrar—*N.Y. State Dept. of Mental Hygiene*, 28 p., illus., paper, single copies free upon request direct to publisher, 217 Lark St., Albany, N. Y. The N. Y. Department of Mental Hygiene employs 37,000 persons, over one third of all the state's employees, and requires one third of the state's total operating budget.

EXPLORING THE UNKNOWN: Research at the University of Wisconsin—James A. Larsen, under the direction of Pres. Conrad A. Elvehjem—*Univ. of Wis. News Service*, 94 p., illus., paper, free upon request direct to publisher, Madison 6, Wis. Describes the basic research in an institution where research funds are fluid and co-operation among workers in the various specialized fields is an established tradition.

FUNDAMENTALS OF THERMODYNAMICS—Carroll M. Leonard—*Prentice-Hall*, 376 p., illus., \$8. An introductory course with special application to power plants, refrigeration, air conditioning, heat transfer and flow of fluids.

A GUIDE TO ASTRONOMY—Lloyd Mallan—*Arco*, 132 p., illus., \$2. A reporter's survey of astronomy with many photographs and explanatory diagrams.

HAMMOND'S GUIDE TO THE EXPLORATION OF SPACE—Walter Mesaros, illus.—*Hammond*,

chart 29 x 42 inches, illus., paper, \$1. Depicts solar system, gravity, paths of satellites, etc., with explanatory text.

HEAT EXCHANGERS: Applications to Gas Turbines—W. Hrynyszak—*Academic*, 343 p., illus., \$10. Deals not only with the factors affecting the performance of the heat engine, but also with their effect on the design and cost of other engine components.

HUMAN COMMUNICATION AND GENERAL SEMANTICS—Joseph Mickel—*New Voices*, 102 p., paper, \$2. Includes glossary and bibliography.

THE KINETICS OF VINYL POLYMERIZATION BY RADICAL MECHANISMS—C. H. Bamford and others—*Academic*, 318 p., \$8.80. For chemists interested in the mechanism of free radical reactions and those engaged in the industrial application of vinyl polymerization.

MISSILE ENGINEERING HANDBOOK—C. W. Besserer—*Van Nostrand*, 600 p., illus., \$14.50. Equations, formulas, graphs and tables important in weapons system analysis. Complete glossary of guided missile and space flight terms.

NATIONAL SCIENCE FOUNDATION: Review of the First Eleven Months of the International Geophysical Year—Hearings, Alan T. Waterman and others—*Committee on Appropriations*, 192 p., illus., paper, free upon request direct to publisher, U. S. Congress, Washington 25, D. C. Reports on meteorological and geophysical research, and the satellite program.

THE NEW INTERNATIONAL YEAR BOOK: A Compendium of the World's Progress for the Year 1957—Susan V. Brady, Ed. Dir.—*Funk*, 576 p., illus., \$10.

NUCLEAR MOMENTS—H. Kopfermann, translated from the German and ed. by E. E. Schneider—*Academic*, 505 p., illus., \$13. Text includes references on recent work up to August 1956. Author and subject index, element index and detailed explanation of symbols.

101 WILDFLOWERS OF SHENANDOAH NATIONAL PARK—Grant and Wenonah Sharpe—*Univ. of Wash. Press*, 40 p., drawings by the authors, paper, \$1. Flowers arranged according to color index, will assist in quickly finding name of flower found.

REACTORS OF THE WORLD—Nuclear Engineering—*Simmons-Boardman*, 12 cut-away drawings and data, paper, \$2.50. Depicts reactors from Canada, Great Britain, Russia and the United States.

REINFORCED PLASTICS DIVISION: 13th Annual Technical and Management Conference—Johan Bjorksten and others—*Soc. of Plastics Industry*, preprint, 627 p., illus., paper, \$7. Includes papers on high temperature performance and new materials. Question-and-answer book follows automatically as soon as printed.

THE SLIDE RULE AND HOW TO USE IT: A Text-Work Book—Hobart H. Sommers, Harry Drell and T. W. Wallenslaeger—*Follett*, 3rd ed., 208 p., illus., \$1.50. Teaching aid for the training of technical workers and junior engineers.

SLOAN-KETTERING INSTITUTE FOR CANCER RESEARCH: Progress Report XI, June 1958—C. P. Rhoads, director—*Sloan-Kettering Inst.*, 28 p., illus., paper, free upon request direct to publisher, 410 E. 68th Street, New York 21, N.Y.

THIS IS ASTRONOMY—Lloyd Motz—*Archer House (Herman & Stephens)*, 250 p., illus., \$3.95. Introduction to modern astronomy for students and amateurs, incorporating the latest discoveries and theories of present-day astrophysics.

VEHICLE PERFORMANCE: As Affected by Pavement Edge Lines and Traffic Signals—Brian J. Lewis and I. L. Thomas, Jr.—*Highway Res. Bd.*, Bull. 178, 20 p., illus., paper, 60¢.

Science News Letter, August 2, 1958

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ICHTHYOLOGY

Experts Studying Puzzle Of Shrinking Salmon

► KOKANEES, land-locked blueback or sockeye salmon, in Lake Pend Oreille, Idaho, continued to shrink in 1957.

Charles Whitt of Farragut, fish biologist for the Idaho game department, says creel and other checks indicate the 1957 kokanees are slightly shorter than those of the previous year.

Average length of the land-locked salmon now is about ten inches, or a fraction of an inch under the length of the 1956 kokanee.

The mystery of the shrinking kokanee has been a matter of concern to fish and game department officials, sportsmen, commercial fishermen and others for several years.

Creel checks show the average kokanee was more than 12 inches long in 1951. The average has dropped fractionally each year since.

Why has the kokanee been shrinking?

Mr. Whitt said a lot of theories have been advanced but no one knows for sure why the fish are smaller each year. Many fishermen are convinced there are too many kokanee in the lake.

"We may find that several factors are responsible," he said. "It is conceivable that the lake may be over-populated with the fish. There may be less food for the kokanee in the lake each year. And the kokanee may be faced with stiffer competition each year from other game fish."

Science News Letter, August 2, 1958

MEDICINE

Blame Prevalent Disease On Poor Living Conditions

► POOR SANITATION and standards of living may breed an infection that hits approximately 25% of the women of the United States yearly.

The infection is caused by the protozoan parasite known as *Trichomonas vaginalis*. It is responsible for vaginal discharges and inflammation. However, the infection is relatively easy to cure, Dr. C. Lee Buxton, chairman of the department of obstetrics and gynecology at the Yale School of Medicine, said.

An investigation involving some 2,000 women in all walks of life was conducted last year to determine what environmental factors were related to the infection, Dr. Buxton and co-workers from his department, Drs. David Weinman and Carl Johnson, reported. Poor living conditions were a factor in a large percentage of cases.

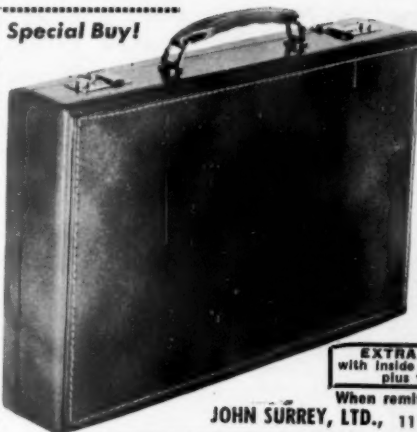
At least two factors should be considered in the transmission of the infection, Dr. Buxton told scientists at the American College of Obstetricians and Gynecologists meeting in Los Angeles.

The first factor is the transmission by sexual contact; the second is the prevalence of the infection as the result of social and economic conditions and personal hygiene and cleanliness.

Plans are now underway to investigate transmission methods of the disease in hopes of finding ways and means of eradicating it.

Science News Letter, August 2, 1958

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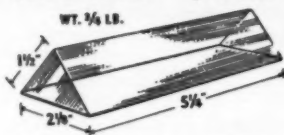
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EDUCATION

High Schools Are Place For Foundation in Math

► **HIGH SCHOOL** is the place for learning high school mathematics, not college, a U. S. Department of Health, Education and Welfare study shows.

And the skilled mathematics teacher is more important to a student's learning than either class size or various physical teaching devices.

Some 350 colleges participated in the survey of mathematics teaching summarized in an Office of Education bulletin written by Kenneth E. Brown.

Concerning the role of remedial programs in mathematics given in colleges, the report stressed that "no study shows that the college freshman receives, through a short remedial mathematics course, a desirable foundation in high school mathematics." One of the studies also showed a "most significant difference in pupil achievement under the various teachers in the experiment.

Copies of the 73-page report are available from the U. S. Government Printing Office, Washington 25, D. C., for 25 cents each.

Science News Letter, August 2, 1958

PHYSIOLOGY

Laughter Can Prove Fatal Or at Least Exhausting

► **IT IS** possible to die laughing.

Uncontrolled or involuntary laughter can be extremely exhausting, if not fatal.

Involuntary laughter may persist for only a few seconds, or it may deteriorate into a prolonged episode, lasting for hours, days or weeks, resulting in complete emotional and physical exhaustion.

This type of laughter can be caused by epilepsy or lesions of the brain, Drs. Mat-

thew W. Wood, Hendrik J. Svien and David Daly of the Mayo Clinic, Rochester, Minn., report in the published *Proceedings of the Staff Meetings of the Mayo Clinic* (May 14). Victims of multiple sclerosis often experience uncontrolled laughter also, the doctors say.

A case they cited involved a 75-year-old man who was seized by an attack of uncontrolled laughter at his mother's funeral. Death followed three such fits of hilarity. Examination revealed a tumor of the brain.

Other examples included children, middle-aged and older men and women who had uncontrolled giggles in combination with symptoms such as weeping, whining, restlessness or epileptic seizures.

An important step in helping these victims of involuntary laughter is the accurate determination of the source or cause of the laughter, the doctors point out.

Science News Letter, August 2, 1958

PSYCHOLOGY

Competition on Highway Related to Accidents

► **IT IS** aggressiveness or competitive speed rather than just a love of moving fast that gets the automobile driver into trouble on the highway.

The fellow most involved in accidents is the one who believes that "It's fun to pass other cars on the highway even if you're not in any hurry."

The most competitive not only have the greatest number of accidents for which they are responsible but they are guilty of the greatest number of traffic law violations.

But as a man grows older, he becomes less aggressive. The number of years he has driven or the number of miles he has covered seem to have no effect on this attitude which is not a matter of experience so much as becoming more mature.

These conclusions are among those reported to the Highway Research Board, Washington, D. C., by Dr. Leon G. Goldstein of the Department of the Army and James N. Mosel of George Washington University.

Science News Letter, August 2, 1958

MEDICINE

Blood Test May Help Detect Rare Disease

► **A NEW BLOOD** test that frequently detects a rare but often fatal disease in time for effective treatment has been announced.

Making use of a blue dye, the test helps doctors diagnose LE, lupus erythematosus, a disease that affects the connective tissues of the body and may attack the skin, joints, kidneys and other organs.

The method of detection was devised by Dr. C. David Cooper of George Washington University and Drs. Thomas McPherson Brown, William R. Felts and Ruth H. Wichelhausen of that university and the Veterans Administration Hospital, Washington, D. C.

Science News Letter, August 2, 1958

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Questions

ARCHAEOLOGY—What is the suspected origin of the Lydian tongue? p. 73.

CHEMISTRY—How do lipids affect baking? p. 66.

GEOPHYSICS—What is the theory of "free nutation"? p. 67.

ORNITHOLOGY—How does the Emperor penguin feed its young? p. 73.

Photographs: Cover and p. 71, B. F. Goodrich; p. 67, Goodyear; p. 69, Westinghouse Electric Corporation; p. 74, Thiokol Chemical Corp.; p. 80, Eastman Chemical Products, Inc.

TECHNOLOGY

Photo Flashbulb Has Built-in Power Supply

► **PHOTOGRAPHIC FLASHBULBS** that have their own built-in "batteries" have been developed at Battelle Memorial Institute, Columbus, Ohio.

The new flashbulbs, ranging from "mid-gets" up to standard number five size, carry within their metal bases small but simple primary cells, or batteries, made of magnesium foil, paper and silver-plated copper in alternating layers.

Dr. John McCallum, project leader of the group developing the device, said the tiny sandwich cells are activated by moistening with drops of water. This produces enough power to flash the bulb. The current lasts for about 20 minutes, and the bulb may be triggered anytime during that period.

Dr. McCallum said the bulbs are only the experimental end product of "research to determine how compact and simple a power cell we could build," and at present there are no plans to produce them commercially.

Science News Letter, August 2, 1958

Do You Know?

The effect of high-pitched *noise* on aircraft components has become one of the most difficult problems facing missile and airplane designers.

Motor vehicles registered in 1957 in the U. S. numbered 67,100,000, nearly 80% more than in 1947.

The average person *blinks* his eyes 25 times a minute and the blink lasts an average of one-fifth of a second.

The time given by the rotation of the earth, called mean solar time or *Universal Time*, is known to be non-uniform because of variation in the speed of rotation of the earth.

Conditioned reflexes take place in the "wakefulness" area, a small structure deep in the brain called the reticular formation.

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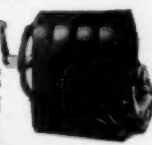
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❁ **COLLAPSIBLE CARRIER** can be used to carry cartons of milk home from the store or beverage glasses outdoors. The lightweight carrier is made from aluminum and has a plastic carrying handle. It weighs approximately one pound.

Science News Letter, August 2, 1958

❁ **GOLFING TUBES** are designed to separate and protect each club in a golfer's bag. The 33½-inch-long tubes of vinyl plastic can be used with any type golf bag. Each tube is snapped into position in a rigid plastic template made in various sizes and shapes to fit the bags.

Science News Letter, August 2, 1958

❁ **WHIRLING TOY** has a variable pitch propeller for either vertical or curving flights. The toy is made in two parts: a flexible plastic ring to which are attached four propeller blades and a launcher. Power is supplied by rubber bands attached to a pull-knob and nylon cord.

Science News Letter, August 2, 1958

❁ **PLASTIC BLINDERS** help bowlers avoid distraction from adjoining alleys. The blinders, shown in the photograph, are essentially frames with extensions forward on



either side. They have no lenses. The bowling aids are molded of an acetate plastic.

Science News Letter, August 2, 1958

❁ **HALF-GALLON CONTAINER** for hot or cold liquids has graduation markings in pints and quarts. Made of a polyethylene plastic, the container is non-breakable and

can be sterilized by boiling. A cover for the spout is attached to the container by a molded-in tape.

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❁ **UNDERWATER SPOTLIGHT** for skin-divers has a sealed beam spot of 40,000 candlepower and a double-powered battery power pack. The unified battery-and-case has been pressurized so it can function to depths of 250 feet. Two screw caps attach the battery unit to the removable headlight and its handle.

Science News Letter, August 2, 1958

❁ **RANGE-TOP SET** made of a polyethylene plastic is described as resisting heat distortion. The set consists of a grease cup and shakers for salt and pepper. The grease cup is designed to hold an empty tin can.

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❁ **GARDEN SPEAKER** for high-fidelity fans can be connected, if you have an outdoor outlet, to any set, radio or record player. The mushroom-shaped top, molded of unbreakable fiber glass, holds the speaker. The unit is water-proofed and garden green in color.

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Nature Ramblings



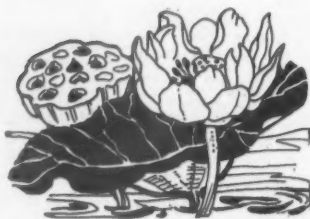
By HORACE LOFTIN

▶ A COMMON "fault" of mankind in dealing with nature is the tendency to interpret the world of plants, animals and non-living things from the "human point of view." That is, man ascribes human traits or motives to the non-human objects of nature. The progress of science can, to a large extent, be measured by the degree to which he has been able to lay aside his own human preconceptions to look at nature objectively.

For example, we almost instinctively want to say a plant kept in the shade bends toward greatest source of illumination because it "is seeking light." This is giving the plant credit for reasoning power that it totally lacks.

Actually, the plant bends toward light because plant growth hormones are more active on the darker side of a stem than on the lighter. The darker side therefore grows faster than the lighter side, and the stem

Nature's Point of View



bends towards the light after a few hours. This purely chemical and mechanical response benefits the plant by helping it to get into the best light for growth. However, this is a far cry from saying that the plant "seeks" light.

A similar situation is that of plants whose blossoms open in the daytime but close at night. This does not happen because a plant "wants" to protect the blossoms at night or expose them to sun or pollinating insects during the day.

What happens is that, with the coming of day, temperature changes affect the growth rate of cells in the petals. An increase in temperature is followed by faster growth of cells on the inner side, thus opening the petals. Cooling leads to faster growth of the cells on the outside and the petals curve in, the space for their growth is limited, closing the blossom with night.

"Cheery," "sweet," "singing for joy," "bursting with exuberance"—these and a thousand expressions like them have been used to talk about and explain the nature of bird song. But closer to the fact of the matter would be "belligerence."

Objective study has shown most birds apparently sing to stake out their private, inviolate territory and advertise their unpleasant intentions towards interlopers. This seems to be the major function of bird song, a function hardly expected until man learned to observe nature from nature's point of view.

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